U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT **Assistant Secretary for Housing-Federal Housing Commissioner**	**Series and Series Number:**
TO: DIRECTORS, HOUSING DIVISION **DIRECTORS, MULTIFAMILY DIVISION** **DIRECTORS, SINGLE FAMILY DIVISION**	**MATERIALS RELEASE NO.** 1301
	ISSUE DATE: October 26, 1998
	REVIEW DATE: October 26, 2001

SUBJECT: **1. Product** CONTEC Autoclaved Aerated Concrete (AAC) Block Units

2. Name and Address of Manufacturer

CONTEC Mexicana, S.A.DE C.V.
Anillo Periferico No. 333
Col. San Jemo
Monterrey, N.L.
Mexico CP 64630

Texas CONTEC, Inc.
Subsidiary in the U.S.
12087 Starcrest
Blossom Business Center
San Antonio, TX 78247

Data on the nonstandard product, described herein have been reviewed by the Department of Housing and Urban Development (HUD) and determination has been made that it is considered suitable from a technical standpoint for the use indicated herein. This Release does not purport to establish a comparative quality or value rating for this product as compared to standard products normally used in the same manner.

This Materials Release cannot be used as an indication of endorsement, or approval by HUD of the described product, and any statement or representation, however made, indicating such approval or endorsement by HUD is unauthorized. See Code 18, U.S.C. 709.

Any reproduction of this Release must be in its entirety.

USE: Masonry bearing and non-bearing walls for exterior and interior use.

DESCRIPTION:

CONTEC AAC block units are composed of cement, lime, gypsum, quartz sand to which aluminum powder is added as an expanding agent to obtain a homogeneous cellular structure. Autoclaving (high pressure curing) is used to attain the final strength of the material. Nominal densities of the material range from 28 pcf (450 kg/m^3) to 44 pcf (700 kg/m^3) corresponding to a nominal compressive strength of 350 psi (25 kg/cm^2) and 710 psi (50 kg/cm^2) respectively. AAC is non-combustible and possesses fire resistance capabilities, acoustic isolation and thermal insulation properties.

Table-Properties of Contec AAC Blocks

Characteristics	GP2/0.5	GP4/0.7	Units
Maximum Density	31 (500)	44 (700)	pcf (kg/m^3)
Design Weight[1]	37 (600)	52 (840)	pcf (kg/m^3)
Compressive Strength (due to flexure only)	356 (25)	711 (50)	psi (kg/cm^2)
Masonry Compressive Strength (f'm)	211 (15)	305 (21)	psi (kg/cm^2)
Masonry Shear Strength (V)	39 (2.73)	53 (3.72)	psi (kg/cm^2)
Modulus of Elasticity	185000 (13,000)	256000 (18,000)	psi (kg/cm^2)
Shrinkage	0.00205 (.25)	0.00210 (.25)	in/ft (mm/m)
Thermal Expansion Coefficient	8 x 10^{-6}	8 x 10^{-5}	K^{-1}
Resistance to Freezing	0.969	0.979	---
Moisture Content (Average)	8	8	%

[1]Values consider material moisture content.

CONTEC AAC blocks are used in load bearing and non-load bearing masonry walls. The blocks are manufactured in two density classes which are GP2 and GP4. Units are 2 feet (62.5 cm) long by 4- or 8-inch-high (40 cm), thickness vary from 2 inches (5 cm) to 12 inches (30 cm). U-blocks are used on both load bearing and non-load bearing walls and are produced with a minimum thickness of 6 inches (15 cm).

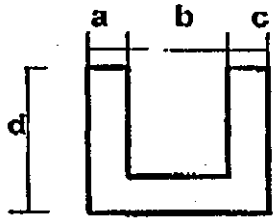
Table - Dimensions for Block Units

Contec Wall Units	Thickness inches (cm)	Height inches (cm)	Nominal Length inches (cm)
GP2 & GP4	2, 4 inches (5.0, 10.0) (Only GP2)	8, 16, 24 (20, 40, 60)	25 (62.5 cm)
	(4 to 8) (10 to 20), in 1 inch (2.5 cm) increments		
	(20 to 30), in 2 inch (5 cm) increments		

Table - Dimensions for Jumbo Wall-Construction Units

Contec Wall Units	Thickness inches (cm)	Height inches (cm)	Nominal Length inches (cm)
Semi-Jumbo GP2 & GP4	4 to 8 inches (10 to 20), in 1 inch (2.5 cm) increments 8 to 12 inches (20 to 30), in 2 inch (5 cm) increments	16 inches (40)	25 inches (62.5)
Jumbo GP2 & GP4	4 to 8 inches (10 to 20), in 1 inch (2.5 cm) increments 8 to 12 inches (20 to 30), in 2 inch (5 cm) increments	25 inches (62.5)	40 inches (100)

Table - Dimensions for U-Block Construction Units

U-Block Construction Units				
Thickness inches (cm)	a inches (cm)	b inches (cm)	c inches (cm)	d inches (cm)
5.9 (15.0)	1.48 (3.75)	2.95 (7.50)	1.48 (3.75)	2.17 (5.50)
6.9 (17.5)	1.67 (4.25)	3.54 (9.00)	1.67 (4.25)	2.17 (5.50)
7.9 (20.0)	2.07 (5.25)	3.64 (9.25)	2.17 (5.50)	2.17 (5.50)
9.8 (25.0)	1.87 (4.75)	6.10 (15.50)	1.87 (4.75)	2.17 (5.50)
11.8 (30.0)	2.36 (6.00)	7.09 (18.00)	2.36 (6.00)	2.17 (5.50)

CONTEC AAC construction system employs connections and fixtures specially designed for AAC construction. For connection of load bearing and non-load bearing masonry walls, metal strip connectors are used. The connectors are hot dip galvanized to provide resistance against moisture. The galvanized coating shall comply with ASTM A 153-95.

Connectors for non-load bearing wall panels, either vertical or horizontal, are also hot dip galvanized fixtures which are fabricated with ASTM A-86 steel. Fastening elements recommended for AAC construction are detailed in CONTEC Design Manual, dated April 1998.

ANALYSIS AND DESIGN:

All structures using CONTEC AAC blocks units shall be analyzed and designed by a licensed professional engineer to resist the minimum design loads of ASCE 7-95. Masonry units shall be designed in accordance with ACI 530 and ACI 530.1, except as otherwise noted in this Materials Release (MR). Reinforced elements shall be designed based on elastic theory of design following procedures established by RILEM committees 78-MCA and 51-ALC and complying with strength and serviceability requirements of ACI 523.2R/96 "Guide for Precast Cellular Concrete Reinforced Units" and ACI 318-95 Appendix A, except as otherwise noted in this MR. Tables for maximum load for AAC masonry are included in Section 4 of the CONTEC Design Manual, dated April 1998. The following allowable design stresses are recommended for design:

Table - Allowable Design Stresses for AAC Masonry Construction

Property	ASTM Designation	AAC Block Denomination		Allowable Design Stress		Units
		GP2	GP4	GP2	GP4	
Masonry Compressive Strength (f'm)	E447	370 (26)	730 (51)	92 (6.5)	182* (12.8)	psi (kg/cm^2)
Masonry Shear Strength (v)	E518	72 (5.1)	86 (6.0)	24 (1.7)	28** (2.0)	psi (kg/cm^2)
Flexural Bond Strength	E519	80 (5.6)	110 (7.7)	26 (1.8)	36 (2.5)	psi (kg/cm^2)

*A factor of safety of 4 is considered and must be included in the buckling effect in accordance with ACI-530.
**Vertical joints fully mortared, if vertical joints are not mortared, half of this value should be used.

INSTALLATION:

Installation shall be in accordance with Section 5 of the CONTEC Design Manual, dated April 1998 and the following provisions:

Masonry Construction

CONTEC blocks are manufactured to the close tolerances. For this reason thin bed mortar can be used for a 1 to 3mm mortar bed joint. This characteristic assures a uniform insulating properties avoiding the formation of thermal bridges.

CONTEC walls can be used for basement, exterior, interior and infill type of walls.

Working with CONTEC blocks

Before starting construction with CONTEC AAC blocks, foundation requirements shall be revised to assure adequacy for masonry buildings.

Damp proof course

It is recommended to lay damp proof courses to protect against ground moisture especially in the vicinity of the foundation. Exterior side on foundation shall be protected against lateral moisture penetration.

First Layer

A type M cement mortar (ASTM C270) is recommended to be placed over slab on grade for horizontal level. A bituminous felt or other waterproof material is also permitted. The cement mortar used shall be of a resistance at least equal to that of the blocks. CONTEC thin bed mortar shall be applied on vertical joints. Blocks in the first layer shall be perfectly leveled and plumb.

Laying with CONTEC Thin Bed Mortar

CONTEC Thin Bed Mortar is applied to horizontal and vertical joints with a CONTEC trowel of the same width as the block. The mortar consistency shall be such as to allow a free flow from the trowel.

Block shall be laid assuring that the degree of over-lapping is at least 40 percent of the block height. This means an offset of at least 0.39 inches (10 mm) from the previous course. Once the blocks are placed, a rubber mallet and a level are used to assure block's alignment.

Follow-up Work

Any additional work is carried out as usual as for traditional masonry construction.

CONTEC Thin Bed Mortar

CONTEC Thin Bed Mortar is a dry-mixed (ready mixed) component consisting of inorganic aggregated with a maximum size aggregate of 0.04 inches (1 mm), Portland cement and organic additives. These organic additives represent not more than 2 percent by mass. A thin bed mortar with 60 to 65 percent of quartz sand or ground limestone and 35 to 40 percent of sulphate resistant cement should be used. Dispersion powder, rising agents and methyl cellulose will improve mortar properties.

CONTEC Thin Bed Mortar specifications are presented in Section 2.1.13 of the CONTEC Design Manual, dated April 1998.

CONTEC masonry shall not be laid in temperatures below 41°F (5°C). Thin bed mortar sacks shall be kept from the environment, not in contact with the ground.

FIRE RESISTANCE:

CONTEC AAC elements have been tested under ASTM E119 (UL/ANSI 263 NFPA 251) with the exception of the U-blocks. Fire ratings are summarized in the following table:

Table - Contec AAC Fire Ratings

Elements	Fire Ratings (Hours)	UL Design Numbers (UL Fire Resistance Directory 1998)
Non-load bearing Contec block walls 4 inch thick and higher.	4	U919
Load bearing Contec block walls 6 inch thick and higher.	4	U919
Fire protection for existing framing (4-inch-thick Contec block.)	4	X901

ACOUSTIC PERFORMANCE:

Acoustic performance requires analysis and design by an acoustic specialist. Additional information concerning acoustic design is available in Section 2.1.9 of the CONTEC Design Manual, dated April 1998.

THERMAL PERFORMANCE:

Information regarding performance is available in Section 2.1.10.1 of the "CONTEC Design Manual", dated April 1998.

IDENTIFICATION AND LABELING:

CONTEC Mexicana shall certify that CONTEC AAC block units conform to the requirements stated in this Materials Release (MR). Underwriters Laboratories (UL) and Factory Mutual Research Company (FMRC) shall validate the manufacturer's certification that CONTEC AAC block units meet the requirements of this MR. CONTEC Mexicana shall implement quality control checks as determined by HUD. Validation records of UL and FMRC inspections shall be made available for examination by HUD upon request.

Each block pallet certified as conforming to this MR shall bear the label of the manufacturer, and the HUD MR No. 1301.

INSPECTION:

HUD Field Office personnel will make site inspections to ensure compliance with the special structural system covered by this MR. A copy of the field inspection report shall be sent to HUD Headquarters, Office of Consumer and Regulatory Affairs, Manufactured Housing and Standards Division, when there is evidence of noncompliance with any portion of this MR or if the system does not appear to give satisfactory performance.

CERTIFICATION AND WARRANTY:

The complete wall system covered by this MR shall be built by a company (the "Contractor") whose personnel have been trained by CONTEC Mexicana. CONTEC Mexicana shall furnish the Contractor with a certificate which states that the Contractor is qualified to perform the work under this MR.

Installation of the complete wall system shall be in accordance with the Section 5 of the CONTEC Design Manual and this MR, and shall be the responsibility of the Contractor. For a period of four (4) years from the date of initial occupancy, the manufacturer shall warrant to the owner that the special structural building system covered by this MR shall be free of defects which materially affect the structural integrity and weather resistance of the constructed property. A copy of the warranty shall be given to the owner.

The liability of the manufacturer under this warranty shall be limited to replacement of defective materials and the cost of installation; or at the option of the manufacturer, payment in lieu thereof.

The manufacturer shall not be liable for damage resulting from fire or natural catastrophes such as floods, tornadoes or the failure of the soil to support the foundation. This warranty shall be in lieu of all other warrants, expressed or implied. The manufacturer shall not be liable for incidental or consequential damages such as lost rents or profits.

The manufacturer's warranty does not relieve the builder, in any way, of responsibility under the terms of the Builder's Warranty required by the National Housing Act or under any provisions applicable to any other housing program. A copy of the warranty shall be furnished by the builder to the owner upon completion of the property.

MANUFACTURER'S RESPONSIBILITIES:

Issuance of this MR commits the manufacturer to fulfill, as a minimum, the following:

1. Produce, label and certify the material, product or system in strict accordance with the terms of this MR.

2. Provide necessary corrective action in a timely manner for all cases of justified complaint, poor performance or failure reported by HUD.

3. When requested, provide the Office of Consumer and Regulatory Affairs, Manufactured Housing and Standards Division, HUD Headquarters, with a representative list of properties, in which the material, product or system has been used, including complete addresses or descriptions of locations and dates of installation.

4. Inform HUD in advance of changes in production facilities, methods, design of the product, company name, ownership or mailing address.

EVALUATION:

This MR shall be valid for a period of three years from the date of initial issuance or most recent renewal or revision, whichever is later. The holder of this MR shall apply for renewal or revision 90 days prior to the Review Date printed on this MR. Submittals for renewal or revision shall be sent to HUD Headquarters. Appropriate User Fee shall be sent to:

U.S. Department of Housing and Urban Development
Technical Suitability of Products Fees
P.O. Box 954199
St. Louis, MO 63195-4199

The holder of this MR may apply for revision at any time prior to the Review Date. Minor revisions may be in the form of a supplement to the MR.

If the Department determines that a proposed renewal or supplement constitutes a revision, the appropriate User Fee for a revision will need to be submitted in accordance with Code of Federal Regulations 24 CFR 200.934, "User Fee System for the Technical Suitability of Products Program," and current User Fee Schedule.

CANCELLATION:

Failure to apply for a renewal or revision shall constitute basis for cancellation of this MR. HUD will notify the manufacturer that the MR may be canceled when:

1) conditions under which the documents was issued have changed so as to affect production of, or to compromise the integrity of the accepted material, product or system,

2) the manufacturer has changed its organizational form without notifying HUD, or

3) the manufacturer has not complied with responsibilities it assumed as a condition of HUD's acceptance.

However, before cancellation, HUD will give the manufacturer a written notice, of the specific reasons for cancellation, and the opportunity to present views on why the MR should not be canceled. No refund of fees will be made on a canceled document.

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This Materials Release is issued solely for the captioned firm, and is not transferable to any person or successor entity.
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